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WEATHER AS AFFECTING THE SOUTHERN PINE BEETLE

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ASHEVILLE, N.C.
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Two unusually cold periods have occurred to date in the vicinity of Asheville, N.C. The first on December 9, when the temperature dropped to 9° F. and the second on Dec. 20 when the temperature reached 10° F. It was thought advisable to collect samples of bark containing overwintering brood of the southern pine beetle in order to determine whether or not the low temperatures had any effect on the dormant brood. No bark samples were collected between Dec. 9 and Dec. 20, so it is impossible to determine which of the two cold periods was responsible for the mortality which resulted. The following table gives the results of random samplings of infested bark taken on Dec. 21 after the second cold period:

Bark Sq.In.	Attacks	Larvae: Living	Larvae: Dead	Remarks
45	15	75	50	Dead brood found only bet. bark and wood
96	21	0	152	No brood in the bark; all dead
94	15	124	63	None dead in the bark
248	36	254	157	Brood dead between bark and wood
248	52	480	56	None dead in the bark
236	44	90	180	No brood dead in the bark
240	45	160	291	" " " " "
300	73	284	212	"
215	62	197	80	"
1722	363	1664	1241	
Approx: 12sqft:	30 per sq.ft.	139-- 57.5%	103: 42.5%	

Approximately 12 sq.ft. of bark was sampled. The attack per sq.ft. averaged about 30, which is about the figure for normal attacked trees. The entire brood examined was overwintering as mature or nearly mature larvae. The brood averaged 242 larvae per sq.ft., of which 103 or 42.5% were dead.

The important thing here is not the number of dead brood but the position in the bark occupied by that portion of the brood which was affected, While a very few larvae were found between the bark and the wood, no dead larvae were found in the pupal cells within the bark. All of the larvae recorded as dead when the count was made were found on the inner side of the bark between the bark and the wood. Needless to say the broods were vigorous and apparently normal previous to the cold weather.

The inner bark and wood of trees containing overwintering brood of the southern pine beetle is very moist as compared with the outer corky layers of dry bark. During colder weather (as noted above) a sheet of ice forms between the bark and the wood on infested trees. While it is entirely possible for the more solid inner layers of bark to reach a lower temperature than the outer corky layer which contains many air spaces, this explanation does not seem entirely adequate when based on temperature alone.

The higher moisture content of the inner bark results in increased radiation from this particular area and thus lowers the temperature of the insects occupying it. The insects residing in the outer bark are subject to less moisture and therefore less radiation and do not reach the low fatal temperatures while the thermometer remains as high as about 10° F. Zero temperatures, however, are known to be fatal to the insects of this species which occupy the outer bark.

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